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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,599	01/21/2004	Takahiro Matsumoto	1232-5256	5047

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EXAMINER

UNDERWOOD, JARREAS C

ART UNIT PAPER NUMBER

2877

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/762,599

Applicant(s)

MATSUMOTO, TAKAHIRO

Examiner

Jarreas C. Underwood

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 06 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 6, 7, 9, 12 and 13 is/are rejected.
- 7) ☒ Claim(s) 4 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 10, line 14 – page 12, line 13, filed 6 July, 2006, with respect to the rejection of claim 1 under Magome et al (United States Patent 5,805,866) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Magome in view of Mishima (United States Patent 7,019,836).
2. Applicant's arguments, see page 13, line 1 – page 15, line 16, filed 6 July, 2006, with respect to the rejection of claims 6 and 7 under Magome et al (United States Patent 5,805,866) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Magome in view of Mishima (United States Patent 7,019,836).

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1, 4-6, 12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

With respect to claims 1 and 12, neither the method of detecting disposition of a plurality of shot areas on an object, nor the method of inspecting an overlay state between a first mark and a second mark in each of a plurality of shot areas produce any tangible results.

Part b. *Practical Application the Produces a Useful, Concrete, and Tangible Result* under Section IV *Determine Whether the Claimed Invention Complies with the Subject Matter Eligibility Requirement of 35 U.S.C. Sec. 101*, sentence 3, in the OG Notice from 22 November 2005 states 'In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible, and concrete."'

Merely detecting or inspecting would not appear to be sufficient to constitute a tangible result, since the outcome of the detection or inspection step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. See OG Notices: 22 November 2005, "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility".

Hence, the claims are treated as nonstatutory functional descriptive material.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 6, 7, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Magome et al (United States Patent 5,805,866) in view of Mishima (United States Patent 7,019,836).

4. As to claim 1, Magome teaches a method of detecting disposition of a plurality of shot areas on an object, said method comprising:

a first detection step of detecting an alignment mark in the plurality of shot areas (column 1, lines 64-65), the alignment mark including elements that have an interval therebetween (Figure 7, element MXi);

a second detection step of detecting the disposition of the plurality of shot areas, a number of the plurality of alignment marks having been determined by said determination step (column 2, lines 21-26).

Magome fails to teach an evaluation step of evaluating reproducibility of the interval of the detected alignment mark, and a determination step of determining a number of alignment marks in the plurality of shot areas based on the evaluated reproducibility. However to do so is well known as taught by Mishima. Mishima teaches an evaluation step of evaluating reproducibility of the interval of the detected alignment mark (abstract, Figure 1B, and column 3, lines 50-61), and a determination step of determining a number of alignment marks in the plurality of shot areas based on the evaluated reproducibility (column 4, lines 4-9, and column 12, line 59 – column 13, line 3). It would have been obvious to one of ordinary skill in the art at the time of invention to include an evaluation step of evaluating reproducibility of the interval of the detected alignment mark, and a determination step of determining a number of alignment marks in the plurality of shot areas based on the evaluated reproducibility, in order to accurately evaluate the pure performance of an alignment detection system without the influence of the stability/instability of a wafer stage.

5. As to claim 6, Magome discloses everything claimed, as applied above in claim 1, with the exception of said evaluation step evaluating the reproducibility based on a

standard deviation of a plurality of the interval of a plurality of the detected alignment mark. However to do so is well known as taught by Mishima. Mishima teaches an evaluation step evaluating the reproducibility based on a standard deviation of a plurality of the interval of a plurality of the detected alignment mark (column 4, lines 10-22, and column 3, lines 20-22). It would have been obvious to one of ordinary skill in the art at the time of invention to include an evaluation step evaluating the reproducibility based on a standard deviation of a plurality of the interval of a plurality of the detected alignment mark, in order to improve the linearity precision in measurement of an alignment mark in a defocused state.

6. As to claim 7, Magome discloses an apparatus for detecting disposition of a plurality of shot areas on an object, the plurality of shot areas being exposed to a pattern in accordance with the detected disposition, said apparatus comprising:

- a detector (Figure 4, elements 26X, 26Y) configured to detect alignment mark in the plurality of shot areas, the alignment mark (Figure 7, elements Mxi, Myi) including elements that have an interval therebetween;

- a processor (Figure 4, element 6), to cause said detector to detect the determined number of alignment marks in the plurality of shot areas (column 2, lines 12-21), and to detect the disposition of the plurality of shot areas based on the detection of the determined number of alignment marks (column 2, lines 21-26).

Magome fails to teach the processor is configured to evaluate reproducibility of the interval of the detected alignment mark, to determine a number of alignment marks in the plurality of shot areas based on the evaluated reproducibility.

However to do so is well known as taught by Mishima. Mishima teaches a processor configured to evaluate reproducibility of the interval of the detected alignment mark (column 3, lines 50-61), to determine a number of alignment marks in the plurality of shot areas based on the evaluated reproducibility (column 4, lines 4-9, and column 12, line 59 – column 13, line 3). It would have been obvious to one of ordinary skill in the art at the time of invention to include a processor configured to evaluate reproducibility of the interval of the detected alignment mark and to determine a number of alignment marks in the plurality of shot areas based on the evaluated reproducibility, in order to evaluate the pure performance of an alignment detection system without the influence of the stability/instability of a wafer stage.

7. As to claim 9, Magome in view of Mishima discloses everything claimed, as applied above, in addition Magome teaches an exposure apparatus (Figure 4) for exposing an object to a pattern, said apparatus comprising: an apparatus as defined in claim 7 for detecting disposition of a plurality of shot areas on the object.

Claims 13, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Magome in view of Mishima, and further in view of Arai et al (United States Patent Application Publication 2001/0007498).

8. As to claim 13, Magome teaches an apparatus for inspecting an overlay state between a first mark and a second mark in each of a plurality of shot areas on an object, each of the plurality of shot areas having been formed through an exposure of the object to a pattern, said apparatus comprising:

a detector (Figure 4, elements 26X, 26Y) configured to detect the first mark in the plurality of shot areas, the first mark including elements that have an interval therebetween (Figure 7, element Myi);

a processor (Figure 4, element 6) configured to

to cause said detector to detect the first mark and the second one in each of the determined number of shot areas (column 2, lines 12-21) and

to detect the overlay state with respect to each of the determined number of shot areas based on the detection of the first mark and the second mark in each of the determined number of shot areas (Figures 9A, 10).

Magome fails to teach a film being formed on the first mark, the second mark formed on the film. However to do so is well known as taught by Arai. Arai teaches a film being formed on the first mark, the second mark formed on the film (abstract). It would have been obvious to one of ordinary skill in the art at the time of invention to include a film being formed on the first mark, the second mark formed on the film, in order to more accurately determine the alignment of an overlay with respect to the first mark.

Magome fails to teach a film being formed on the first mark, the second mark formed on the film. However to do so is well known as taught by Arai. Arai teaches a film being formed on the first mark, the second mark formed on the film (abstract). It would have been obvious to one of ordinary skill in the art at the time of invention to have a film being formed on the first mark, the second mark formed on the film, in order

to more accurately determine relative placements of the overlay relative to the first mark.

Magome fails to teach a processor configured to evaluate reproducibility of the interval of the detected first mark (column 3, lines 50-61), to determine, based on the evaluated reproducibility, a number of the plurality of shot areas with respect to each of which the overlay state is to be inspected (column 4, lines 4-9, and column 12, line 59 – column 13, line 3). However to do so is well known as taught by Mishima. Mishima teaches a processor configured to evaluate reproducibility of the interval of the detected first mark, to determine, based on the evaluated reproducibility, a number of the plurality of shot areas with respect to each of which the overlay state is to be inspected. It would have been obvious to one of ordinary skill in the art at the time of invention to include a processor configured to evaluate reproducibility of the interval of the detected first mark, to determine, based on the evaluated reproducibility, a number of the plurality of shot areas with respect to each of which the overlay state is to be inspected, in order to evaluate the pure performance of an alignment detection system without the influence of the stability/instability of a wafer stage.

9. As to claim 12, the method would flow from the apparatus of claim 13, above.

Allowable Subject Matter

10. Claims 4, 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: as to claims 4 and 5 the prior art of record, taken alone or in combination, fails to disclose or render obvious a determination step determining, as the number of alignment marks, a minimum natural number N_a that satisfies $N_s = .\alpha. * (Mr / Ar).sup.2 / N_m$, and $N_s > .\alpha. * f(N_m, Mr, Ar)$, respectively, where Mr is the reproducibility, N_m is a number of the elements included in the alignment mark, Ar is required accuracy, and $.\alpha.$ is a corrective coefficient that is not smaller than 1 and not greater than 3.

Conclusion

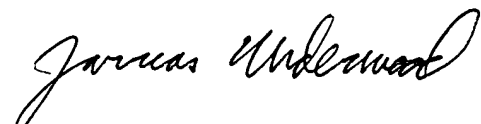
11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Ota et al (United States Patent 5,561,606); Magome et al (United States Patent 5,754,300); Best et al (usp6,914,664); Mishima (United States Patent 5,943,135).

- Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jarreas C. Underwood whose telephone number is (575) 272-1536. The examiner can normally be reached on Monday-Friday 0630-1500.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Jarreas Underwood
Patent Examiner
Art Unit 2877
8/25/2006

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